COMPLETE LISTING OF PENDING CLAIMS

1. (currently amended) A method for applying a metallurgical coating to a superalloy substrate having an underlying grain structure, the method comprising the steps of:

a) directing a water jet having a pressure of about between 45,000 to 65,000 psi against the surface of the superalloy substrate while traversing the surface at a sweep rate of about between 25 to 100 inches per minute and at a stand-off distance of about between .375 to 1.00 inches, to modify the surface morphology of the substrate in such a manner so as to expose the underlying grain structure of the superalloy; and

b) depositing a metallurgical coating on the modified surface of the substrate by high velocity oxygen fuel spray, wherein the modified surface of the substrate has a microscopic roughness characteristic that promotes the formation of a bond between the substrate and the metallurgical coating that is sufficient in strength to support deposition of a coating having a thickness in excess of about 0.500 inches.

Claims 2-3 (canceled)

4. (original) A method according to Claim 1, further comprising the step of heat treating the coated substrate.

5. (original) A method according to Claim 4, wherein the step of heat treating includes heat treating the coated substrate under vacuum.

6. (original) A method according to Claim 5, further comprising the step of subjecting the coated substrate to hot isostatic pressing.

7. (original) A method according to Claim 1, wherein the step of directing a water jet at the surface of the substrate includes directing a water jet at the surface at a pressure of about 55,000 psi.

8. (original) A method according to Claim 1, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a platinum aluminide metallurgical coating onto the surface of the substrate.

9. (original) A method according to Claim 1, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a MCrAlY metallurgical coating onto the surface of the substrate, wherein M is selected from the group consisting of Co, Ni and NiCo.

10. (currently amended) A method for applying a metallurgical coating to a superalloy substrate having an underlying grain structure, the method comprising the steps of:

a) roughening the surface of the superalloy substrate through grit blasting;

b) directing a water jet having a pressure of about between 45,000 to 65,000 psi against the roughened surface of the substrate while traversing the surface at a sweep rate of about between 25 to 100 inches per minute and at a stand-off distance of about between .375 to 1.00 inches, to modify the surface morphology of the substrate in such a manner so as to expose the underlying grain structure of the superalloy; and

c) depositing a metallurgical coating on the modified surface of the substrate by high velocity oxygen fuel spray, wherein the modified surface of the substrate has a microscopic roughness characteristic that promotes the formation of a bond between the substrate and the metallurgical coating that is sufficient in strength to support deposition of a coating having a thickness in excess of about 0.500 inches.

11. (original) A method according to Claim 10, further comprising the step of vacuum heat treating the coated substrate.

12. (original) A method according to Claim 11, further comprising the step of subjecting the coated substrate to hot isostatic pressing.

13. (original) A method according to Claim 10, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a platinum aluminide metallurgical coating onto the surface of the substrate.

14. (original) A method according to Claim 10, wherein the step of depositing a metallurgical coating on the surface of the substrate includes depositing a MCrAlY metallurgical coating onto the surface of the substrate, wherein M is selected from the group consisting of Co, Ni and NiCo.

15. (currently amended) A method for applying a two-layer metallurgical coating system to a superalloy substrate an underlying grain structure, the method comprising the steps of:

a) directing a water jet having a pressure of about between 45,000 to 65,000 psi against the surface of the superalloy substrate while traversing the surface at a sweep rate of about between 25 to 100 inches per minute and at a stand-off distance of about between .375 to 1.00 inches, to modify the surface morphology of the substrate in such a manner so as to expose the underlying grain structure of the superalloy;

b) depositing a first metallurgical coating layer onto the modified surface of the substrate by high velocity oxygen fuel spray, wherein the modified surface of the substrate has a microscopic roughness characteristic that promotes the formation of a bond between the substrate and the first metallurgical coating layer that is sufficient in strength to support deposition of a coating layer having a thickness in excess of about 0.500 inches;

c) directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallic coating layer; and

d) depositing a second coating layer onto the modified surface of the first metallurgical coating layer.

16. (original) A method according to Claim 15, further comprising the step of grit blasting the surface of the substrate to increase surface roughness prior to treating the surface of the substrate with a water jet.

17. (original) A method according to Claim 15, wherein the step of depositing a second coating layer onto the modified surface of the first metallurgical coating layer includes deposition of a second metallurgical coating layer onto the modified surface of the first metallurgical coating layer by high velocity oxygen fuel spray.

18. (original) A method according to Claim 15, wherein the step of depositing a second coating layer onto the modified surface of the first metallurgical coating layer includes deposition of a ceramic coating layer onto the modified surface of the first metallurgical coating layer by plasma thermal spray.

19. (original) A method according to Claim 18, wherein the step of depositing a second coating layer includes deposition of a 6-8 weight % Yttria stabilized zirconium oxide ceramic thermal barrier coating over the modified surface the first metallurgical coating layer.

20. (original) A method according to Claim 17, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a platinum aluminide metallurgical coating.

21. (original) A method according to Claim 17, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a MCrAlY metallurgical coating, wherein M is selected from the group consisting of Co, Ni and NiCo.

22. (original) A method according to Claim 15, further comprising the step of vacuum heat treating the coated substrate prior to deposition of the second coating layer.

23. (original) A method according to Claim 22, further comprising the step of subjecting the coated substrate to hot isostatic pressing prior to deposition of the second coating layer.

24. (currently amended) A method for applying a three-layer metallurgical coating system to a superalloy substrate having an underlying grain structure, the method comprising the steps of:

a) directing a water jet having a pressure of about between 45,000 to 65,000 psi against the surface of the superalloy substrate while traversing the surface at a sweep rate of about between 25 to 100 inches per minute and at a stand-off distance of about between .375 to 1.00 inches, to modify the surface morphology of the substrate in such a manner so as to expose the underlying grain structure of the superalloy;

b) depositing a first metallurgical coating layer onto the modified surface of the substrate by high velocity oxygen fuel spray, wherein the modified surface of the substrate has a microscopic roughness characteristic that promotes the formation of a bond between the substrate and the first metallurgical coating layer that is sufficient in strength to support deposition of a coating layer having a thickness in excess of about 0.500 inches;

c) directing a water jet having a sufficient pressure against the surface of the first metallurgical coating layer for a sufficient time period to modify the surface morphology of the first metallurgical coating layer;

d) depositing a second metallurgical coating layer onto the modified surface of the first metallurgical coating layer by high velocity oxygen fuel spray;

e) directing a water jet having a sufficient pressure against the surface of the second metallurgical coating layer for a sufficient time period to modify the surface morphology of the second coating layer; and

f) depositing a third coating layer onto the modified surface of the second metallurgical coating layer.

25. (original) A method according to Claim 24, further comprising the step of grit blasting the surface of the substrate to increase surface roughness prior to treating the surface of the substrate with a water jet.

26. (original) A method according to Claim 24, wherein the step of depositing a third coating layer onto the modified surface of the second metallurgical coating layer includes deposition of a ceramic coating layer onto the modified surface of the second metallurgical coating layer by plasma thermal spray.

27. (original) A method according to Claim 26, wherein the step of depositing a third coating layer includes deposition of a 6-8 weight % Yttria stabilized zirconium oxide ceramic thermal barrier coating over the modified surface the second metallurgical coating layer.

28. (original) A method according to Claim 24, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a platinum aluminide metallurgical coating.

29. (original) A method according to Claim 24, wherein the deposition of at least one of the first and second metallurgical coating layers includes the step of depositing a MCrAlY metallurgical coating, wherein M is selected from the group consisting of Co, Ni and NiCo.

30. (original) A method according to Claim 24, further comprising the step of vacuum heat treating the coated substrate prior to deposition of the second coating layer.

31. (original) A method according to Claim 30, further comprising the step of subjecting the coated substrate to hot isostatic pressing prior to deposition of the second coating layer.

32. (withdrawn) A gas turbine component made by a process comprising the steps of:

a) providing a gas turbine component defining a superalloy substrate;

b) directing a water jet having a sufficient pressure against the surface of the superalloy substrate for a sufficient time period to modify the surface morphology of the substrate; and

c) depositing a metallurgical coating layer onto the modified surface of the substrate by high velocity oxygen fuel spray.

33. (withdrawn) A gas turbine component made by a process comprising the steps of:

a) providing a gas turbine component defining a superalloy substrate;

b) roughening the surface of the substrate through grit blasting;

c) directing a water jet having a sufficient pressure against the roughened surface of the substrate for a sufficient time period to modify the surface morphology of the substrate; and

d) depositing a metallurgical coating on the modified surface of the substrate by high velocity oxygen fuel spray.

Claims 34-46 (canceled)